University of Toronto

COMPUTER SCIENCE

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GENERAL NEWS

Project '72 1
   The S/370 Arrives 1
   Software Systems 1
   New Prices for System/370 CPU and Core 1
   The I/O WAITTIME Question 2
Revisions to the URM 4
System/370 Job Classes, Their Defaults and Limits 4
Suggestions 5
Personnel Changes 6
Council of Ontario Universities 6
The 3rd Ontario Universities Computer Conference 8
Recent Acquisitions in the Department of Computer Science Library . . 8

PRODUCTION AND QUALITY INFORMATION

Production Statistics 11
System Reliability 12
Credit Requests for November 12
System Status Bulletins Issued 13

S/360 GENERAL SERVICES

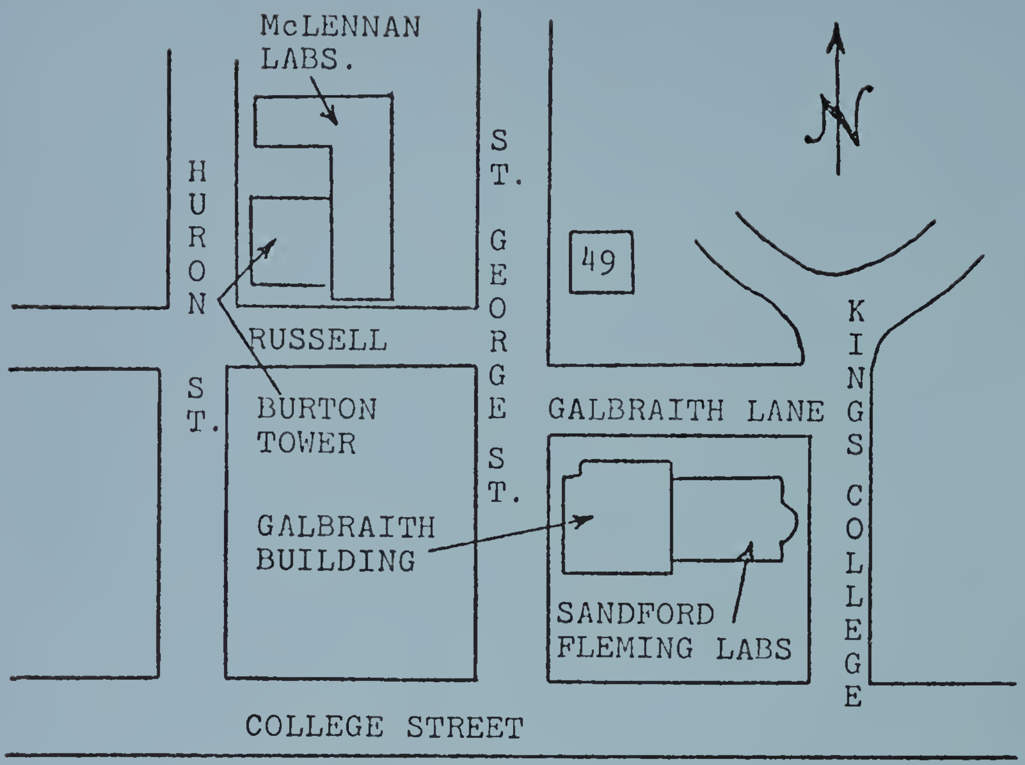
Disk-to-tape Backup Facilities 14
Instream Procedures 14
Statistics on Catalogued Procedures 17

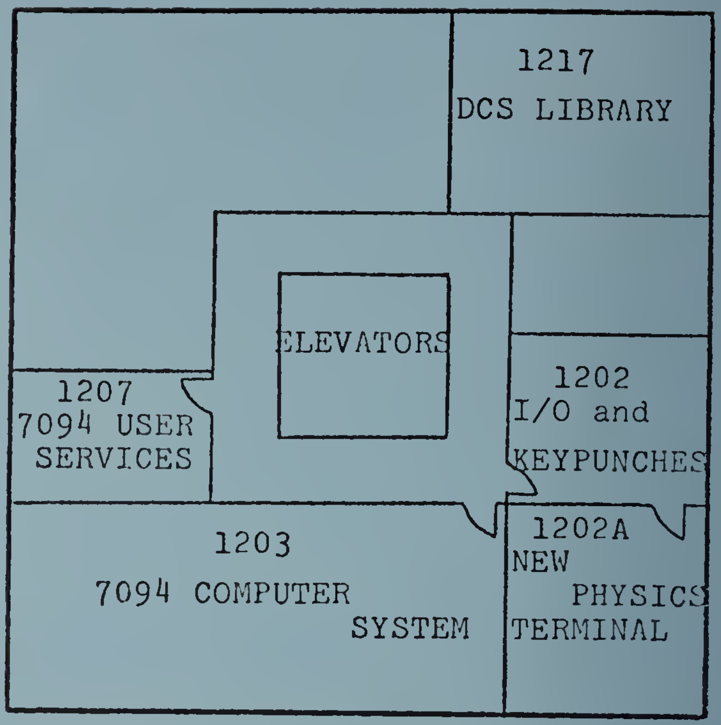
INTERACTIVE TERMINAL SYSTEMS 19

HIGH SPEED JOB STREAM SERVICES 22

7094 SERVICES 26

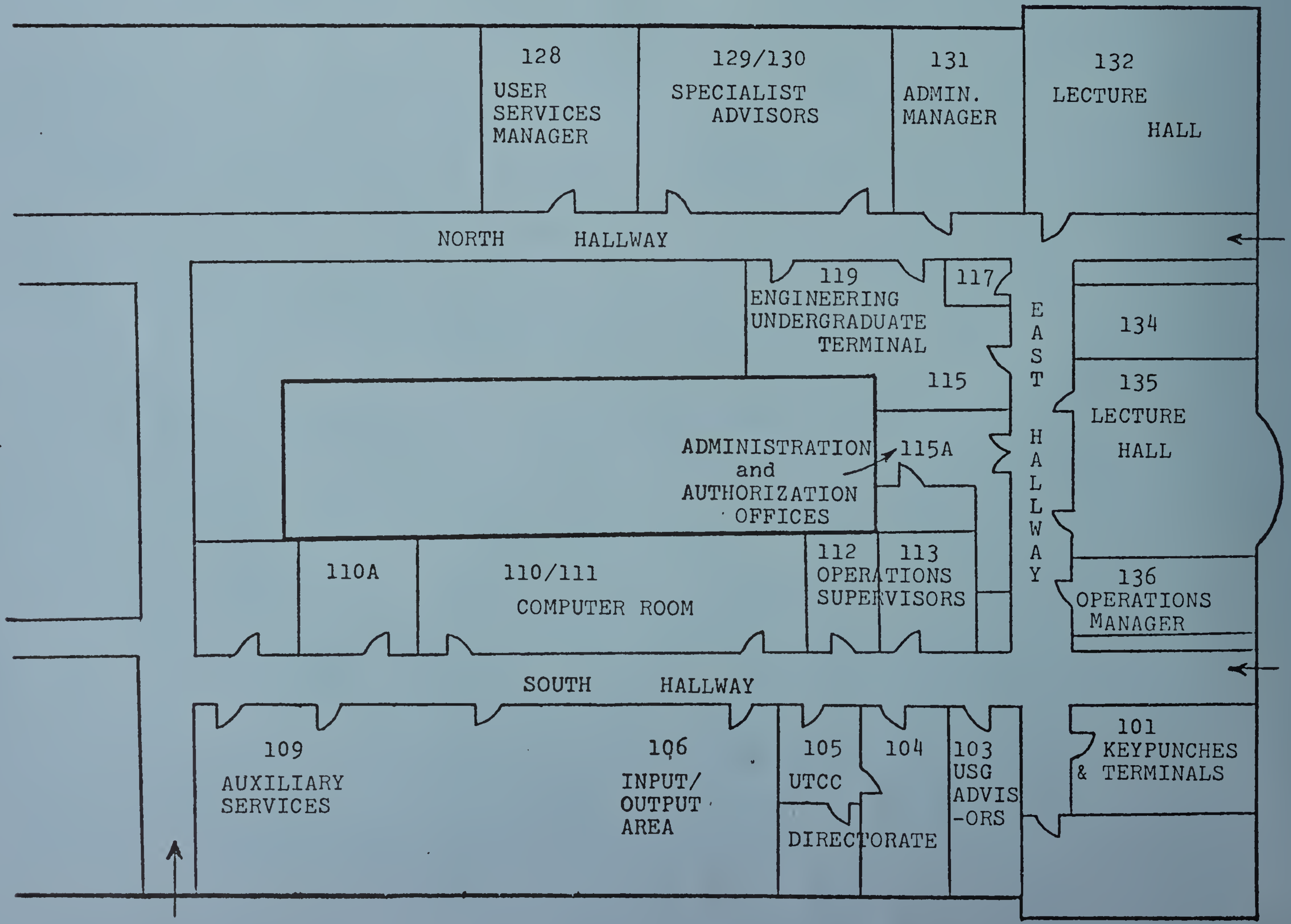
APPENDIX: RATE SCHEDULES 27





FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



PROJECT '72

The S/370 Arrives

C. A. Ford

Project '72, the set of activities which will produce a working System/370-165 by January 3, has proceeded on or ahead of schedule at date of writing. The Interactive S/360-65, which came back into service many hours ahead of schedule after its relocation into a new computer room, had set the standard. The removal of all I/O gear from Room 111 Sandford Fleming, occurring between midnight Friday, December 3 and 9 a.m. Saturday morning December 4, was also completed hours ahead of schedule.

The first S/370 components, a motor generator set and the Coolant/Power Distribution Unit, came in on December 1st and 8th respectively. The remaining SYSTEM/370 components arrived December 9, a full week ahead of schedule.

These early completions owed much to the energy applied by many agencies to meeting milestones in a detailed and carefully laid plan. The support of the University's Physical Plant Department, its contractors, and IBM has been outstanding throughout. These early completions assure the meeting of the balance of the schedule through January 3.

Software Systems

C. A. Ford

System checkout of the OS/20.1 and HASP 3.0 operating software for the S/370 was performed on a Model 165 in Poughkeepsie N.Y. in late November. These tests were eminently successful, indicating an easy transition from S/360 to S/370 for both UTCC and the user community. Upward compatibility seems to be a real fact.

Continued use of OS/20.1 and HASP 3.0 on our S/360 computers is allowing us to further improve the system position for January 3 through correction of minor bugs. During the Christmas/New Years week UTCC will bring the new S/370 software systems up to the latest specifications.

New Prices for System/370 CPU and Core

R. Williams

To reflect the improved capabilities of the System/370 new prices will be set for two major cost components. The C.P.U. rate for the S/370 will be $8.50 per minute while the core charge will be $1.05 per hundred KB minutes. In addition to the changes in these two rates, the factor for computing I/O WAITTIME will be set at .0245 secs per I/O event. A later item discusses the WAITTIME phenomenon.

One major criterion used in setting these rates was that no job should cost more to run on the S/370 than it did on the S/360. Another was that the Computer Centre should be able to support the cost of the new equipment, allowing for its increased speed. A third was that earnings on CPU and CORE should be in proportion to the installed costs. Analysis of the initial tests on the S/370 led to the establishment of the rates quoted here, and further tests have verified that the first constraint has been met for all but a few trivially small jobs in the cases compared so far between S/360 and S/370.

Further studies are underway, in conjunction with the Computer Users' Group, with more jobs to be run on both S/360 and S/370 to make additional cost comparisons. Users are reminded that when the S/360 is no longer available it will be difficult to validate claims that jobs are costing more on the S/370. We hope that you will have submitted your test jobs before the Christmas holidays.

If it happens that these tests indicate that the rates quoted here result in a significant portion of jobs yielding a higher cost, then suitable adjustments to the rates will be made at the end of January. Please watch for further announcements on the progress of these tests in the System Status Bulletins and HOTNEWS.

A complete list of the rate schedules is given in the Appendix of this Newsletter.

The I/O Waittime Question

R. Mayhew

When working out the CPU and core prices it was assumed that I/O WAITTIME would be the same on both the S/360-65 and the S/370-165 for a given job. There was some initial surprise to find that S/370 WAITTIME sometimes exceeded that of the S/360. Since this was not to be a user cost factor, the impact of this fact has been relieved by changing the old 26.6 msec constant to 24.5 msec, thus making the average S/370 WAITTIME (for jobs tested thus far) equal to the average S/360 WAITTIME.

The ERT (Equivalent Run Time) technique was adopted in 1969 when HASP and OS/MVT were brought into service here. ERT, given by the formula ERT=(CPU + I/O WAITTIME), is a simple, practical, and effective measure which is related to the time a job would stay in the system if it were not subject to any CPU or I/O contention with other jobs. I/O

WAITTIME is, however, not entirely satisfactory, as shown by the variance between S/360 and S/370.

To understand the I/O WAITTIME calculation, first consider the O/S WAIT-POST mechanism. A program requests an asynchronous operation (usually I/O) by issuing a READ, WRITE, EXCP, etc. Each request causes a system program (for example an access method or the I/O Supervisor) to be scheduled in order to satisfy the request. So that the two programs (the requestor and the servicer) can communicate, there is an ECB (Event Control Block) associated with each request. The requestor uses it to determine when the request has been completed (via a WAIT); the servicer to indicate that the request has been satisfied (via a POST).

In order to minimize the total time from beginning to end, programs try to issue I/O requests as early as possible and then continue processing with something independent of the completion of that particular I/O request. When the program must have information associated with that request, it issues a WAIT. The system then will not give control back to the program until that request has been satisfied, (as indicated by the requestor issuing a POST of that ECB).

Since the I/O processing runs asynchronously to the program, it is possible that the request may be satisfied prior to the program needing the results of the request. That is, the POST may occur prior to the WAIT. Then, when the WAIT is issued by the requestor, there is no real "wait" and the system may return control immediately.

In our current system, I/O WAITTIME is calculated by multiplying a constant times the number of instances when the WAIT precedes the POST. It is not simply the number of WAITs issued, or the number of EXCPs, or the number of SIOs, or the amount of I/O time used, or any other popular conception. Thus, if a given CPU is replaced by a faster CPU, and the I/O configuration remains the same, it is possible that a given program may experience more "real" WAITs.

More satisfying methods of estimating a "residency time" are desired and various schemes have been studied. These studies will continue. Meanwhile, on the average, I/O WAITTIME should not be a factor in our S/360-to-S/370 job cost comparisons.

REVISIONS TO THE URM

Janet Marsh

Revisions 2 and 3 have arrived back from the printers and are being mailed to all holders of the Users' Reference Manual.

SYSTEM/370 JOB CLASSES, THEIR DEFAULTS AND LIMITS

Janet Marsh

With the implementation of the SYSTEM/370 on January 3, 1972, the defaults and limits for the existing job classes A, B, and C will change. These changes are required as a result of the increase in internal speed of the SYSTEM/370. The new defaults and limits for Classes A and B are given below. An * denotes a change from SYSTEM/360.

Class A

- no tape or disk mounts,

* - maximum time estimate = 5 minutes, (default = 1 minute)

- maximum region size = 200K bytes, (default = 70K bytes)

* - maximum line count = 15,000 lines, (default = 3,000 lines)

* - maximum number of cards punched = 2,000 cards, (default = 400 cards)

Class B

* - mounts are permitted as follows: two 9-track tapes and/or one 7-track tape, and/or one disk

* - maximum time estimate = 5 minutes, (default = 1 minute)

- maximum region size = 200K bytes, (default = 70K bytes)

* - maximum line count = 15,000 lines, (default = 3,000 lines)

* - maximum number of cards punched = 2,000 cards, (default = 400 cards)

Class C

- for jobs exceeding any of the limits for Classes A or B

High Speed Job Stream

All language processors available to the High Speed Job Stream will have identical execution limits.

- maximum time estimate = 3 seconds, (default = 1 second)

- maximum line count = 300 lines, (default = 60 lines)

- maximum number of pages = 10,(default = 1)

SUGGESTIONS

Janet Marsh

The number of suggestions received this month has increased considerably - 62 this month as compared to only 42 last month. These suggestions are broken down into the following general categories: technical issues (11), Computer Centre policies (3), equipment and Physical Plant ideas (12), advising services (3), general job handling procedures (14), keypunches (3), manuals (2), system test time (2), new printer forms (3), and miscellaneous (9). Some of these are quoted and discussed below:

Suggestion: "That new paper you are using is atrocious. The lines are too heavy and the crest is too dark, making it extremely difficult to read output!"

Reply: That particular shipment of paper was returned and we are using a substitute pending the arrival of a shipment of acceptable paper.

Suggestion: "... you request too much information on your UTCC Job Form."

Reply: The UTCC Job Form is for CLASS C jobs only, or for special printer or CALCOMP setups. Only the pertinent sections need be completed. The program SPEC is sufficient for CLASS B jobs.

Suggestion: "Clean up ASUT!"

Reply: Several steps have been taken to clean up ASUT: more janitor support, user education, more waste baskets, and the recycling of the majority of cards and paper.

Suggestion: "Why not give all HSJS language processors the same limits?

Reply: See the article on Job Classes, Their Defaults and Limits in this Newsletter.

Suggestion: "Congratulations on getting the interactive system up and running so soon. I never would have believed it. Good work!"

Reply: Nine hours ahead of schedule was the only surprise for UTCC. Glad we could do it for you.

PERSONNEL CHANGES

Jennifer Schick

New to the Computer Centre during the last month is Miss Eileen Friedman, who has joined Al Wickens' Development group.

Best wishes to Mrs. Marilyn Chadee (nee Waithe) who was married on December 4.

COUNCIL OF ONTARIO UNIVERSITIES

Janet Marsh

The University of Toronto Computer Centre is cooperating in a computer network project with other Ontario universities. We will be represented by Mr. A. Kowaliw for a period of one year starting December 1, 1971. Mr. C. A. Ford, Assistant Director, is a member of a task force on computer charging, another project of the Office of Computer Coordination, Council of Ontario Universities.

The following is quoted from the Council of Ontario Universities' Monthly Review.

'The objectives of the Office of Computer Coordination are: first, to enable the universities to exploit economies of scale which can be derived from their aggregate purchasing power of computing services in such a way as to negate the effects of geography as far as possible; second, to ensure that the universities are kept informed about developments in computing technology; and third, to study and advise on future arrangements for cooperation among universities in the provision of computer services, and on methods of financing such arrangements.

Most of the activities of the OCC involve cooperation and participation by individual members of the universities in its several Task Forces and Interest Groups. Currently, the major area of activity for the OCC centres on developing an Ontario universities' computer communications network.

The Council of Ontario Universities gave the Office of Computer Coordination its support in the analysis and development of plans for a computer communications network, as outlined in the report of the Task Force on Data Communications.

The OCC is currently involved in the first phase, which consists of creating a threshold service through the establishment of a minimal working network by linking together a number of universities with data communications lines, developing an inter-university tariff structure and performing a major network system design.

It is expected that the final design specifications, financial plans, management plans and a detailed cost/benefit analysis will be submitted to the Council of Ontario Universities for approval in February 1972.

The proposed network is planned to be a distributed, store-and-forward system based on Node Control Units (NCUs) located at each computer site. The NCUs will be developed around mini-computers and will use special hardware and software. The primary functions of an NCU will be to handle user terminals and to interface with both a high-speed communications network and large-scale computer systems.

This network will enable a geographically distributed population of user terminals to communicate with a diverse population of large-scale computer systems. Further, the network will be invisible to both the user terminals and the computer systems. With regard to reliability, the network is expected to provide a level of performance as good as, or better than, that attainable using direct point-to-point connections.

In brief, the major impact of a network will be that the computer user will no longer be subject to the restrictions imposed by the use of any one machine. He will have available to him a spectrum of machines and services, enabling him to make the fullest and most efficient use of his computer expenditure."

THE 3RD ONTARIO UNIVERSITIES COMPUTER CONFERENCE

Janet Marsh

The 3rd Ontario Universities Computing Conference will be held on February 24 and 25, 1972 at the Inn on the Park, Toronto. The theme of the conference is "The Contribution of the Computer to the Educational Process." The conference is open to university educators, administrators, and computer users and anyone interested should contact:

Mr. M. P. Brown
Conference Chairman,
Office of Computer Coordination,
Council of Ontario Universities,
102 Bloor Street West,
Toronto 181, Ontario

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Andrews, H. C.
Computer Techniques in Image Processing.
New York, Academic Press, 1970.

Bakker, J. W. de.
Formal Definition of Programming Languages, With an Application to the Definition of ALGOL 60.
Amsterdam, Mathematisch Centrum, 1967.

Bates, F.
Programming Language/One, by Bates and Douglass.
2d ed.
Englewood Cliffs, N. J., Prentice-Hall, 1970.

Davis, Gordon B.
Introduction to Electronic Computers. 2d ed.
New York, McGraw-Hill, 1971.

Fernback, S., ed.
Computers and Their Role in the Physical Sciences, ed, by S. Fernbach and A. Taub.
New York, Gordon and Breach, 1970.

Forsythe, Alexandra I.
Computer Science: BASIC Language Programming.
New York, Wiley, 1970.

Gildersleeve, T. R.
Design of Sequential File Systems.

New York, Wiley-Interscience, 1971.

Harrison, A.
Bibliography on Automation and Technological Change
and Studies of the Future.
Santa Monica, Cal., Rand Corp., Mar. 1971.

Katzan, H. Jr.
APL Programming and Computer Techniques.
New York, Van Nostrand Reinhold, 1970.

Lipkin, Bernice Sacks, ed.
Picture Processing and Psychopictorics, ed. by
Lipkin and Rosenfeld.
New York, Academic Press, 1970.

Miller, A. R.
The Assault on Privacy: Computers, Data Banks,
and Dossiers.
Ann Arbor, University of Michigan Press, 1971.

Nie, Norman.
SPSS: Statistical Package for the Social Sciences.
New York, McGraw-Hill, 1970.

Peterson, W. W.
FORTRAN IV and the IBM/360 by Peterson and Holz.
New York, McGraw-Hill, 1971.

Symposium on Associative Information Techniques,
General Motors Research Laboratories, 1968.
Associative Information Techniques, ed. by E. L. Jacks.
New York, American Elseview, 1971.

Systems Symposium, 4th, Case Western Reserve University, 1968.
Theoretical Approaches to Non-Numerical Problem Solving,
ed. by R. B. Banerji and M. D. Mesarovic.
Berlin, Springer-Verlag, 1970.

THESES RECENTLY ACQUIRED IN DCS LIBRARY

Alexander, W. G.
How a Programming Language is Used. MSc.

Bauer, M. A.
DPSS: An Interactive Program That Solves Problems. MSc.

Dean, B. C.
The Role of Cauchy Integral Formula in Solving
Polynomial Equations. MSc.

Gobeil, D. R.
Features of a Management Information System. MSc.

Graham, G. S.
Protection Structures in Operating Systems. MSc.

Grimson, J. B.
A Performance Study of Some Directory Structures for Large Files. MSc.

Hildyard, P. M.
Studies of Inverted File Structures. MSc.

Jones, R. D.
The Design & Implementation of a Chess Program for the IBM 360.

Lee, Y. M.
The Minimal Event-Node Network of Project Precedence Relations. MSc.

Mulligan, G. D.
Algorithms for Finding Cliques of a Graph. MSc.

Nguyen, P. T.
Chebyshev Acceleration of Standard Iterative Methods.

Payant, Louis-Marie.
Compilation Techniques for Matrix Arithmetic Expressions. MSc.

Phillips, F. C.
A Phonological Parser. MSc.

Reckhow, R. A.
Diagonal Theorems for Random Access Machines. MSc.

Schroeter, S. R.
PAMALA: A Polynomial and Algebraic Manipulation Language. MSc.

Silverman, J.
A Computer Analysis of Arbitrage in Convertible Bonds. MSc.

Tapia, M. A.
ALAN - An Algebraic Language. MSc.

Webber, C. A.
An Experiment with a Model of a Virtual Memory System. MSc.

PRODUCTION STATISTICS

Jennifer Schick

The total number of jobs run on all computer systems during November (TABLE I) has increased slightly since last month, with the greatest increase in percentage on the 7094 system. The removal of one S/360-65 from general purpose service and the scheduled downtime because of Project '72 undoubtedly inhibited the achievement of a higher S/360 total.

Once again TABLE II reflects the continual increase from year to year in the jobs run on the High Speed Job Stream. The increase from 1969 to 1970 was 21% and that from 1970 to 1971 is 74%. Conversely, the number of jobs run on the 7094 continued its decrease, despite the improvement since October.

SYSTEM	SEPT	OCT	NOV	NOV/OCT CHANGE
S/360	15,459	21,342	21113	- 1%
7094	740	787	903	+15%
HSJS	44,442	118,032	130,560	+11%
TOTAL	60,641	140,161	152,576	+ 9%

TABLE I: Jobs Run - September, October, November 1971

SYSTEM	NOV. '70	NOV. '71	1970/1971 CHANGE
S/360	19709	21113	+ 7%
7094	2090	903	-57%
HSJS	75,193	130,560	+74%
TOTAL	96,992	152,576	+57%

SYSTEM RELIABILITY

Roy Finlayson

We are reporting only on the one "batch" production system in this newsletter. The Interactive S/360, which has been very reliable since its inauguration, will be reported upon also in future newsletters. See also the Interactive Terminal Systems section of this Newsletter.

The reliability of the S/360 system for October and November are shown in the following table for comparison.

	MONTH	UPTIME	MTBF
Local & Remote GPJS	October	96.6%	6.4 hrs
	November	92.8%	4.5 hrs

Uptime and MTBF decreased during the last month. Both of these decreases were caused by software problems in Release 20.1 of OS, Hasp 3.0 and the Monitor for the High Speed Job Stream. Some of our problems have also been caused by a humidity problem at ASUT.

The majority of these problems have now been solved.

CREDIT REQUESTS FOR NOVEMBER

Herb Kugel

The table below summarizes the credit request activity for November. The percentage of jobs experiencing difficulty was roughly the same as in October. For the S/360, we experienced some rise in human error, but this was balanced by a decrease in software/hardware bugs. On the 7094, snags were minimal.

	NOVEMBER			OCTOBER
	S/360	7094	TOTAL	TOTAL
HUMAN	20	1	21	8
SOFTWARE	22	0	22	31
HARDWARE	7	1	8	12
TOTAL	49	2	51	51
% of JOBS RUN			.22%	.20%

SYSTEM STATUS BULLETINS ISSUED

Janet Marsh

73:71:1 Interactive Systems Now Relocated

74:71:1 Shutdown on Saturday December 4, 1971

74:71:2 Future Shutdowns

75:71:1 Cost Comparisons for 360/370 Jobs

76:71:1 System Overload Condition

77:71:1 STATOPEN Procedure for Running EMD Programs

78:71:1 SPSS - Statistical Package for the Social Sciences - Version 3

DISK-TO-TAPE BACKUP FACILITIES

Sylvia May

UTCC would like to remind all users that we provide disk-to-tape backup protection. This service is discussed in section 3.3.4 of the Users' Reference Manual. Users are also reminded that this is not a free service. The rate is $20.00 per cycle with no charge for restoring from tape-to-disk.

Please arrange with Auxiliary Services for this facility.

INSTREAM PROCEDURES

H. Kugel

A new and quite useful feature of OS/360 Release 20.1 is the introduction of instream procedures. This feature allows a user to create and execute a procedure as part of his job without having to place it in any of the procedure libraries. An instream procedure can be executed any number of times during the job in which it appears and a maximum of fifteen different instream procedures can appear in one job. An instream procedure can be modified by the EXEC statement which invokes it just as catalogued procedures are modified now. An instream procedure may be considered as a 'portable' catalogued procedure since it is in the form of cards and can be moved easily from one job to another for testing.

To use instream procedures, all that is necessary is that the cards follow the JOB card in you deck and also, any JOBLIB statement if this is used. The instream procedure cannot appear after the EXEC card that calls it.

Two statements are used to define a particular instream procedure. They are the PROC and PEND statements which are placed at the beginning and end of the instream procedure respectively.

Thus, a basic deck setup could be:

```
//    job cards
//JOBLIB    DD  DSN=USERLIB,DISP=OLD
//procname  PROC


   the instream procedures
```

```
//    PEND
//    EXEC procname



/*
```

When the above instream procedure is written as part of the system output listing (i.e., when MSGLEVEL=(1,1),MSGLEVEL=1 or MSGLEVEL=2 are used), the procedure statements can easily be identified by the following:

a) an ++ appears in columns 1 and 2 of any procedure statement that you did not override;

b) a +/ appears in columns 1 and 2 of any statement you did overide;

c) an ++* appears in columns 1 through 3 of a procedure statement, other than a comment statement, that the system considered to contain only comments;

d) an *** appears in columns 1 through 3 of a comment statement.

Special care should be taken by the user if he finds item (c) on his listing as there is a possibility of an improper continuation in his usage of JCL.

In addition, if symbolic parameters are assigned values on the EXEC statement calling the procedure, the output listing will show the symbolic parameters and the values assigned.

An example may help to illustrate the above. UTCC has a program, APDLIST, which can be used to list the members of a partitioned data set. The data set to be listed is defined by the //PDS DD statement and the program is executed as follows:

```
//     EXEC   PGM=APDLIST
//STEPLIB DD  DSN=IC.MTCB.LINKLIB,DISP=SHR
//SYSPRINT DD SYSOUT=A
//PDS DD DSN=SYS1.PROCLIB,DISP=SHR
```

To test a procedure to execute the above, all we need have is :

```
//    job cards
//LIST  PROC
```

```
//   EXEC  PGM=APDLIST
//STEPLIB DD DSN=IC.MTCB.LINKLIB,DISP=SHR
//SYSPRINT DD SYSOUT=A
//PDS    DD   DSN=SYS1.PROCLIB,DISP=SHR
//    PEND
//       EXEC LIST
/*
//
```

This procedure can be modified to include symbolic parameters. Thus, for instance we could create:

```
//    job cards
//LIST      PROC LIBRARY='SYS1.PROCLIB'
//    EXEC PGM=APDLIST
//STEPLIB     DD DSN=IC.MTCB.LINKLIB,DISP=SHR
//SYSPRINT    DD SYSOUT=A
//PDS         DD DSN=&LIBRARY,DISP=SHR
//     PEND

//S1          EXEC LIST
//S2          EXEC LIST,LIBRARY='SYS2.PROCLIB'
/*
//
```

The above would be used to create the LIST procedure with a default to list the SYS1.PROCLIB. Step 1 lists that library, while step S2 overrides the default name and lists the SYS2.PROCLIB.

Users who wish in depth information should consult the IBM JCL User's Guide (Form GC28-6703-1) for further information.

STATISTICS ON CATALOGUED PROCEDURES USAGE

R. Williams

This month's table covers the period November 3, 1971 to December 3, 1971. The total counts indicate a slight increase in the average daily load, while the breakdown between systems reflects the shift to S/360 #2. Since batch work is no longer being run on S/360 #1, future months will not give the breakdown between systems.

The split between FORTRAN and PL/I remained virtually unchanged from the previous month.

Language	Number of Jobs	Percentage of Total
FORTRAN G	5539	62.5
PL/I	1838	20.8
Assembler	428	4.8
All Others	1051	11.9
	8856	100.0

PL/I users should note that the PL1V5LDG and PL1V5CLG procedures still invoke Release 18.6 Version 5 rather than Release 20.1 Version 5. The regular procedures PL1LLDGO and PL1LFCLG now access Release 20.1, Version 5 of PL/I. The Release 18.6 version of PL/I will only be retained for a limited period of time while it is ascertained that there are no outstanding problems with the Release 20.1 version. All users of PL/I are advised to change to the new version, as soon as possible. This will enable them to be sure they have no outstanding problems and also avoid problems when the Release 18.6 processors are discontinued.

Procedure Usage: November 3, 1971 to December 3, 1971

Procedure	S/360 #1	S/360 #2	Total	Percentage
FORTGCLG	593	1981	2574	28.6
PL1V5LDG	46	951	997	11.0
FORTGLDG	191	796	987	11.1
FORSGCLG	174	603	777	8.6
FORTCALG	108	420	528	5.9
PL1LLDGO	100	419	519	5.8
ASMFCLG	93	251	344	3.8
FORTGLG	53	163	216	2.4
FORTGCL	66	109	175	1.9
FORTHCLG	32	143	175	1.9
PL1LFCLG	30	133	163	1.8
PL1V5CLG	30	129	159	1.8
FORSGLDG	22	85	107	1.2
ASMGCLG	14	70	84	0.9
Others(23 proc.)	276	775	1051	11.7
Incorrect names	14	139	153	1.7
			9009	100.0

Statistical Libraries

Library	Total	Percentage
BMD (total)	545	55.2
SPSS	443	44.8
	988	100.0

Use of the statistical libraries has shown a considerable increase, primarily in the BMD package. 302 of the 545 BMD runs used the Multiple Regression Program, BMD02R.

INTERACTIVE TERMINAL SYSTEMS

Sam Goldfarb

The Interactive Terminal Systems have been operating most successfully from the McLennan Physical Laboratories. Since the move to the new environment there have been no Operating System crashes. In addition, several users have remarked upon the noticeable improvement in the response and execution speeds of each of the systems. For example, with APL in high-speed core, the execution speed for APL has improved by as much as ten times. Moreover, a new operating schedule is already in effect; the schedule is:

Monday to Friday	Midnight - 4:30 a.m. 9:00 a.m. - Midnight
Saturday and Sunday	9:00 a.m. - 5:00 p.m.

Computer Centre users may visit the new installation by calling 928-7107 to arrange an appropriate time.

HOLIDAY SCHEDULE

Sam Goldfarb

The Christmas holiday schedule for the Interactive Systems will be:

Shutdown from Thursday, December 23, midnight to
Friday, December 24, 9:00 a.m.

Shutdown from Friday, December 24, 5:00 p.m. to
Sunday, December 26, 9:00 a.m.

Shutdown from Thursday, December 30, midnight to
Monday, January 3, 12:00 a.m.

The remaining period will follow the normal schedule as outlined above.

APL PUBLIC LIBRARIES

Sam Goldfarb

There are currently 10 Public Libraries available to APL users. These libraries are numbered 1, 2, 3, 4, 5, 6, 7, 9, 12 and 13. The find out what is available in the Public Libraries, type:

```
)LOAD 1 WSINDEX
```

and then type:

```
DESCRIBE
```

For information on obtaining a list and description of the functions in each workspace of a particular library, type:

```
)LOAD n INDEX
```

where "n" is the number of the Public Library, and then type:

```
DESCRIBE
```

NOTE: Library 2 contains 9 workspaces of statistical routines. Library 6 contains a set of routines "COGO" for solving Civil Engineering geometry problems. Library 7 contains general routines for creating computer-aided instruction lessons. (At the present time, this library is not described in WSINDEX). Information on the contents of this library may be found in the Library 7 workspaces APLCATHOW, CAI and CALAPL. e.g., type:

```
   )LOAD 7 APLCATHOW
or )LOAD 7 CAI
or )LOAD 7 CALAPL
```

and then type:

```
DESCRIBE
```

Library 9 contains a computer-aided instruction course on APL for beginners.

Users with programs of general interest are encouraged to make their programs available to others via the Public Library mechanism. For more information, call 928-3787.

APL QUOTE-QUAD

Sam Goldfarb

The APL Quote-Quad is an "informal publication for APL users". It contains "short articles, programming notes, signed opinions, announcements" and interesting APL problems and algorithms. The publication is edited by A. T. McEwan and D. W. A. Watson of Lakehead University and is published by G. H. Foster of Syracuse University. The current issue of the Quote-Quad contains articles on:

"A Survey of APL Compatible Terminals"
"A Proposed APL Extension"
"An On-line Proof Checker Operating Under APL/360,

with Educational Applications in Logic"

The annual subscription charge for the Quote-Quad is $3.00. Interested users may send their subscription requests to:

Garth H. Foster
101 Link Hall of Engineering
Syracuse University
Syracuse, New York 13210
U. S. A.

PRODUCTION STATISTICS FOR THE HIGH SPEED JOB STREAM

John Lees

The accompanying computer-plotted histograms show, terminal-by-terminal, breakdowns of the jobs run at the EUT and ASUT High Speed Job Stream terminals. The histograms show the job-by-job breakdown through time. The time period considered is 8:00 a.m. to 10:00 p.m. The types of jobs are WATFIV (W), ALGOL (G), PL/C (C), PLUTO (P), ASMG (A), and SIMON (S).

These histograms represent an "average" day for the month of November. November is considered to have 30 equal days with Saturday and Sunday being weighted the same as the weekdays.

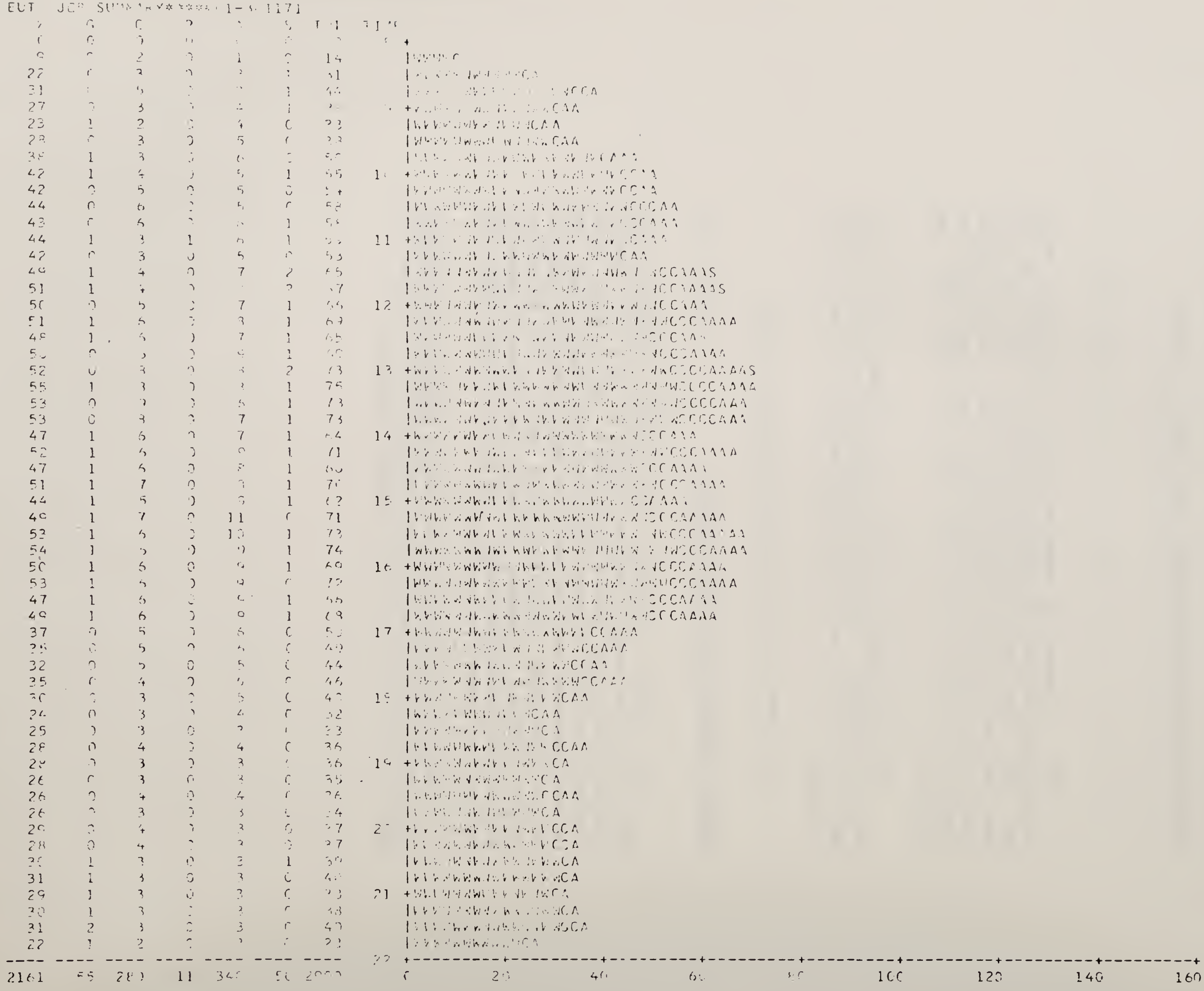
Each symbol on the histogram represents 2 jobs.

REMOTE TERMINAL HIGH SPEED SERVICE

C. A. Ford

The remote computer input-output terminals were attached to the general purpose S/360-65 during the system reconfiguration carried out in November. As a result, these terminals are able to gain access to the High Speed Job Stream processors via the same core region reserved hitherto for the high speed terminals EUT and ASUT. The resultant system overhead economies benefit the general OS user as well as the remote HSJS user. Service at EUT and ASUT has suffered no detectable degradation.

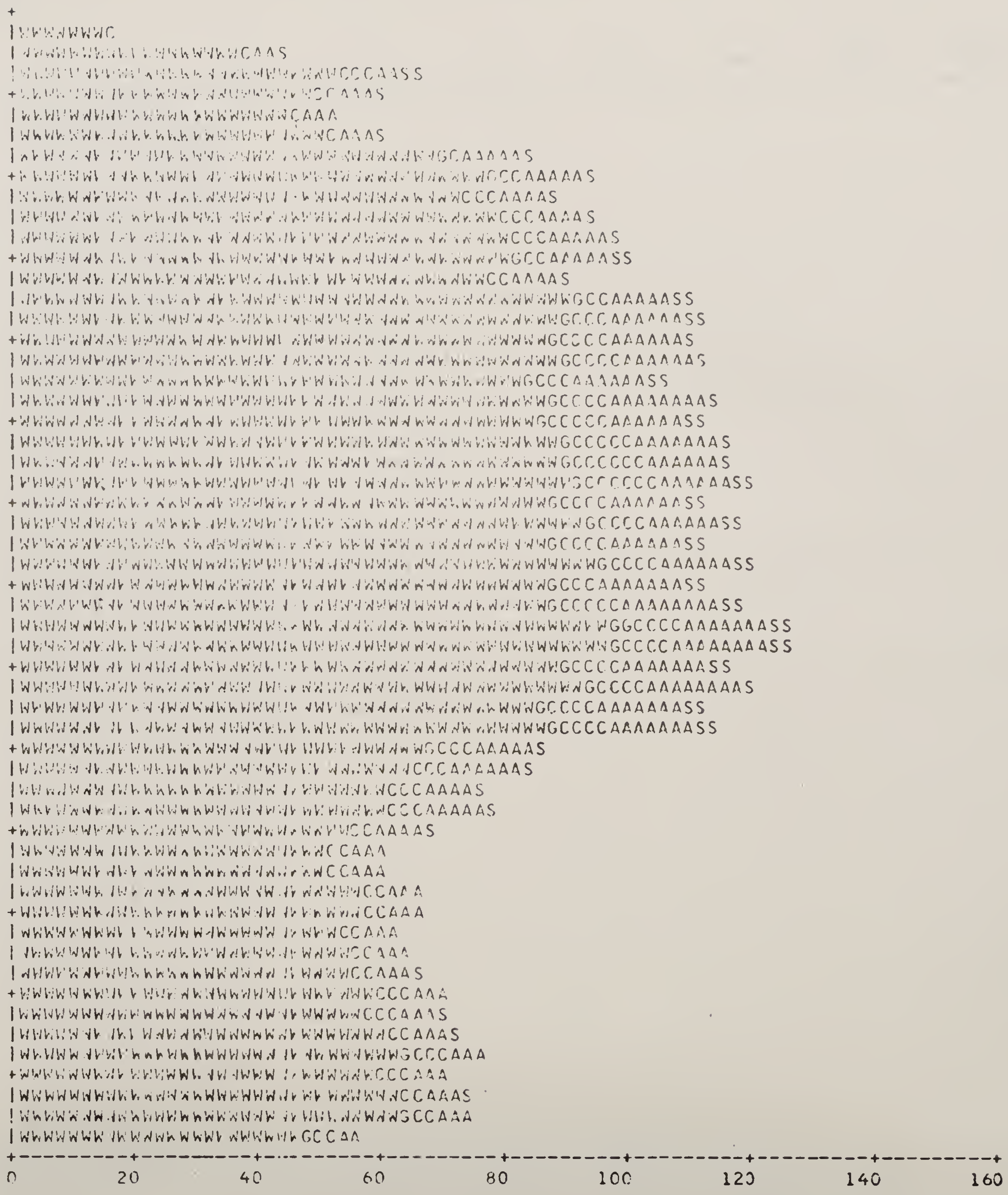
The use of this new system feature (which will continue after the S/370-165 replaces the S/360-65) is a matter of local option to the six remote terminal sponsors.



```
EUT   JOB SUMMARY*****  1-6 1171
                                          TIME
   0    0    0    0    0    0    0     8  +
   9    0    2    0    1    0   14        |
  22    0    3    0    5    1   31        |
  31    1    5    0    6    1   44        |
  27    0    3    0    4    1   35     9  +
  23    1    2    0    4    0   33        |
  28    0    3    0    5    0   33        |
  38    1    3    0    6    0   50        |
  42    1    4    0    5    1   55    10  +
  42    0    5    0    5    0   54        |
  44    0    6    0    5    0   58        |
  43    0    6    0    5    1   55        |
  44    1    3    1    6    1   55    11  +
  42    0    3    0    5    0   53        |
  49    1    4    0    7    2   65        |
  51    1    4    0    9    2   67        |
  50    0    5    0    7    1   66    12  +
  51    1    5    0    8    1   69        |
  48    1    6    0    7    1   65        |
  50    0    5    0    9    1   66        |
  52    0    3    0    8    2   73    13  +
  55    1    3    0    8    1   75        |
  53    0    9    0    5    1   73        |
  53    0    8    0    7    1   73        |
  47    1    6    0    7    1   64    14  +
  52    1    6    0    9    1   71        |
  47    1    6    0    8    1   66        |
  51    1    7    0    9    1   70        |
  44    1    5    0    9    1   62    15  +
  49    1    7    0   11    0   71        |
  52    1    6    0   10    1   73        |
  54    1    5    0    9    1   74        |
  50    1    5    0    9    1   69    16  +
  53    1    6    0    9    0   72        |
  47    1    6    0    6    1   65        |
  49    1    6    0    0    1   68        |
  37    0    5    0    6    0   53    17  +
  35    0    5    0    6    0   49        |
  32    0    5    0    5    0   44        |
  35    0    4    0    6    0   46        |
  30    0    3    0    5    0   40    18  +
  24    0    3    0    4    0   32        |
  25    0    3    0    2    0   33        |
  28    0    4    0    4    0   36        |
  28    0    3    0    3    0   36    19  +
  26    0    3    0    3    0   35        |
  26    0    4    0    4    0   36        |
  26    0    3    0    3    0   34        |
  29    0    4    0    3    0   37    20  +
  28    0    4    0    3    0   37        |
  30    1    3    0    3    1   39        |
  31    1    3    0    3    0   40        |
  29    1    3    0    3    0   33    21  +
  30    1    3    0    3    0   38        |
  31    2    3    0    3    0   40        |
  22    1    2    0    2    0   23        |
---- ---- ---- ---- ---- ---- ----    22  +---------+---------+---------+---------+---------+---------+---------+---------+
2161   55  280   11  345   50 2902        0        20        40        60        80       100       120       140       160
```

```
ASUT JOB SUMMARY*****01-301171
    W     G     C     P     A     S   TOT   TIME
    0     0     0     0     0     0     0     8 +
    5     0     0     0     0     0     7       |WW
   13     0     0     0     1     2    17       |WWWWWWWWWWWWWS
   21     0     0     0     2     3    27       |WWWWWWWWWWWWWWWWWWWWWWAS
   20     0     0     0     2     1    25     9 +WWWWWWWWWWWWWWWWWWWWWA
   18     0     0     0     2     1    22       |WWWWWWWWWWWWWWWWWWWA
   21     0     0     0     2     1    26       |WWWWWWWWWWWWWWWWWWWWWA
   29     1     0     0     3     2    37       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   33     1     0     0     4     2    41    10 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAAS
   29     0     0     0     3     2    36       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   33     0     0     0     3     2    40       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   36     0     0     0     4     2    44       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAAS
   34     1     0     0     3     2    43    11 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   33     0     1     0     3     2    41       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   39     1     1     0     4     3    49       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAAS
   36     1     1     0     3     3    47       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   35     1     2     0     5     2    47    12 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   35     1     1     0     4     2    45       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAAS
   33     0     1     0     5     3    45       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAAS
   34     1     2     0     7     2    48       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAAS
   30     1     2     0     4     2    42    13 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   33     1     2     0     5     2    45       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   32     1     2     0     5     2    44       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   36     1     3     0     6     2    49       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAAS
   36     1     2     0     5     3    49    14 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   38     0     2     0     4     3    49       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   37     1     1     0     3     4    48       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWASS
   41     0     1     0     3     3    52       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   40     1     1     0     6     3    53    15 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWA AAS
   36     1     2     0     5     3    49       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   40     2     2     0     4     4    54       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCAASS
   40     1     2     0     6     3    54       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAAS
   36     1     2     0     5     2    50    16 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   37     1     2     0     6     2    50       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAAS
   35     1     2     0     4     2    46       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   36     1     2     0     5     3    48       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   29     1     2     0     4     1    39    17 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAA
   29     1     2     0     5     1    40       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAA
   28     1     1     0     3     2    37       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWAS
   26     1     2     0     4     2    36       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAAS
   23     0     1     0     3     2    31    18 +WWWWWWWWWWWWWWWWWWWWWWWWAS
   26     0     1     0     2     1    23       |WWWWWWWWWWWWWWWWWWWWWWWWWWWA
   23     0     1     0     3     1    31       |WWWWWWWWWWWWWWWWWWWWWWWA
   28     0     1     0     3     0    34       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWA
   28     0     2     0     3     1    35    19 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCA
   27     0     1     0     4     1    35       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWAA
   27     0     1     0     3     1    35       |WWWWWWWWWWWWWWWWWWWWWWWWWWWA
   28     0     1     0     3     1    35       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWA
   29     0     1     0     3     1    36    20 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWA
   27     0     2     0     3     1    36       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWCA
   30     0     2     0     4     1    39       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAA
   31     0     2     0     4     1    40       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCAA
   30     0     2     0     3     1    38    21 +WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCA
   32     0     2     0     3     1    41       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCA
   31     0     2     0     3     1    39       |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCA
   24     0     1     0     2     0    30       |WWWWWWWWWWWWWWWWWWWWWWWWWA
 ----  ----  ----  ----  ----  ----  ----    22 +---------+---------+---------+---------+---------+---------+---------+---------+
 1708    51    94     5   224   129  2215       0        20        40        60        80       100       120       140       160
```

```
ALL  JOB SUMMARY*****01-301171
   W     G     C     P     A     S   TOT   TIME
   1     0     0     0     0     0     1     8
  15     0     3     0     1     1    21
  36     0     3     0     4     3    43
  52     0     6     0     5     5    71
  48     1     4     0     6     2    63     9
  44     1     2     0     6     1    57
  51     1     3     0     7     2    66
  69     3     3     0    10     3    89
  77     2     4     0    10     3    99    10
  73     1     6     0     9     3    92
  78     1     7     0     9     3    99
  80     1     7     0    10     3   104
  80     2     4     1    10     4   104    11
  77     1     4     0     8     3    96
  90     2     5     0    11     5   116
  89     2     6     0    12     5   116
  85     2     8     0    12     3   114    12
  88     2     9     0    13     3   115
  82     2     7     0    13     4   111
  86     2     9     0    16     3   119
  84     2    11     0    12     5   116    13
  89     2    11     0    14     3   122
  88     2    12     0    12     3   121
  90     2    12     0    13     4   124
  85     2     8     0    13     4   116    14
  92     2     8     0    13     5   122
  96     2     8     0    12     5   115
  94     2     9     0    12     5   124
  87     3     7     0    15     4   118    15
  87     3    10     0    15     4   122
  96     4     8     0    15     5   129
  95     3     8     0    16     5   129
  86     3     9     0    15     4   121    16
  92     3     8     0    16     3   125
  84     3     8     0    14     4   115
  87     2     9     0    14     4   118
  67     2     7     0    11     2    90    17
  65     1     7     0    12     2    89
  61     1     6     0     9     2    81
  61     1     6     0    10     2    82
  53     1     4     0     8     2    71    18
  51     1     4     0     6     1    65
  49     1     4     0     6     1    65
  56     1     5     0     7     0    71
  56     1     5     0     7     1    72    19
  53     1     5     0     7     1    70
  54     1     5     0     7     1    72
  54     1     5     0     6     2    70
  58     1     6     0     7     1    74    20
  56     1     7     0     7     2    74
  60     1     5     0     7     3    79
  63     2     6     0     7     1    81
  59     1     6     0     6     1    76    21
  62     1     5     0     7     2    79
  63     3     5     0     6     1    80
  46     2     4     0     5     0    58
---- ---- ---- ---- ---- ---- ----    22
3912  116  377   17  566  179 5169
```



XPRESS SCHEDULE CHANGE

Joyce Walton

In order to permit more flexible scheduling of our total workload, the Xpress batch timetable will be changed in January to four Xpress batches per day, at 9 a.m., 11 a.m., 1 p.m., and 4 p.m. The same 10-minute, 6,000-line limits will apply, as will the one-hour turnaround (when possible).

"COLLECTIVE BARGAINING"

Joyce Walton

A group of users is negotiating with the UTCC to effectively lower their 7094 computing costs by a scheme of mutual guarantees. They have issued a letter of invitation to all Department Representatives, and further information will be published as it becomes available. If the presently considered plans are adopted, the 7094 service will be maintained at least until December 1972, with a 6 month warning of any discontinuation after that date. Service to users outside the cooperative group will, of course, be maintained at the current level.

RATE SCHEDULES

1. RATE SCHEDULE FOR THE UNIVERSITY OF TORONTO, 1 JAN 1972

A. SYSTEM/370 SERVICE - The General Purpose Job Stream

JOB CHARGE = SF(($CPU*CPUTIME)+($CORE*COREUSAGE)+UR+PDC)

where: SF = Service Factor of 2.00 for RUSH
1.00 for ASAP
0.60 for IOI

$CPU = $8.50 per CPU minute

CPUTIME = measured CPU time in minutes

$CORE = $1.05 per hundred kilobyte minutes of core usage

COREUSAGE = (RA/100)*(1+RA/500)*ERT

RA = Region Allocated (KB)
ERT = Equivalent Run Time (in minutes)
= CPUTIME + I/O WAITTIME
I/O WAITTIME = (.0245 sec. per I/O event)/ 60 min

UR = Unit Record Service Charge

= $0.80 per thousand cards read, plus
$0.80 per thousand lines printed, plus
$2.00 per thousand cards punched

PDC = Peripheral Device Charge

= $4.00 per job requiring disk, tape, or special printer set-up

B. 7094 II/1401 SERVICE

Computation (7094) = $96.00 per system hour

Unit Record Service (1401) = $0.80 per thousand cards read, plus
$0.80 per thousand lines printed, plus
$2.00 per thousand cards punched

C. INTERACTIVE TERMINAL SYSTEMS SERVICE

1. Conversational Programming System (CPS)

   $2.00 per CPU minute, plus
   $1.20 per core page per hour, plus
   $3.00 per connect hour

2. Administrative Terminal System (ATS)

   $3.60 per connect hour

3. APL Service

   $3.00 per CPU minute, plus
   $3.00 per connect hour

4. IBM 2741 Typewriter Terminal Rental

   $95.00 per month for a leased line, or
   $105.00 per month for a dial-up line

   (This rental is not payable in allocated or subsidy funds; it is a real dollar charge).

5. Disk Storage Space

   $0.30 per track per month for ATS permanent storage records, APL workspaces, and CPS load/save and file space

D. MISCELLANEOUS

1. SYSTEM/360 On-line Disk Storage

   $0.30 per track per month

   NOTE: 7294 bytes = one track
   20 tracks = one cylinder
   200 cylinders = one 2316 disk

   (The minimum is one month and the charge is payable in advance).

2. Disk Pack Rental (off-line)

   $25.00 per month

   (The minimum is one whole disk pack for one month and the charge is payable in advance).

3. Disk Pack Storage

   $25.00 initial charge, plus
   $10.00 annual renewal

4. Disk to Tape Backup

   $20.00 per cycle

5. Tape Rental

   $1.00 per tape per month

   (The minimum is one month and the charge is payable in advance).

6. Tape Storage

   $5.00 initial charge, plus
   $1.00 per tape per month

7. Tape Cleaning and Testing

   cleaning = $1.50 per tape (double pass)
   testing = $2.00 per tape

8. Negotiated Contract Services

   Job turnaround handling = $10.00 per man hour
   Programming Assistance = $12.00 per man hour
   Analytical Assistance = $15.00 per man hour

   (These services are not payable in allocated or subsidy funds; they are real dollar charges).

9. CALCOMP Plotting

   $20.00 per plotter-hour

10. Card Processing

Reproduction = $2.00 per thousand cards
Interpretation = $2.50 per thousand cards
Reproduction and Interpretation = $3.50 per thousand cards
Labels = $5.00 per thousand cards
Listing = $1.00 per thousand cards
Keypunching = $5.00 per hour
Keypunch Verifying = $5.00 per hour

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR:		
Dr. John C. Wilson	SF105	6496
ASSISTANT DIRECTOR:		
Mr. C. A. Ford	SF105	2991
ADMINISTRATION MANAGER:		
Mr. Jerry Palter	SF131	8948
AUTHORIZATION CLERK:		
Mrs. Marje Rankin	SF115A	8702
DEVELOPMENT MANAGER:		
Mr. Alan Wickens	49 St. Geo.	6135
INPUT/OUTPUT SUPERVISOR:		
Mr. Derry Cox	SF112	7092
INTERACTIVE SYSTEMS MANAGER:		
Mr. Sam Goldfarb	49 St. Geo.	3787
INTERACTIVE SYSTEMS AUTHORIZATION CLERK:		
Mrs. Cathy Pidcock	SF115A	8703
OPERATIONS MANAGER:		
Dr. Dave McNaughton	SF136	6281
PROCESSING SUPERVISOR:		
Mr. Roy Finlayson	SF112	5058
PROGRAM ADVISORS:	SF103	8599
TECHNICAL EDITOR:		
Mrs. Janet Marsh	49 St. Geo.	6131
TERMINAL SUPERVISOR:		
Mr. Alan Jones	SF112	6220
USERS' SERVICES GROUP MANAGER:		
Mr. Robin Williams	SF128	2694
7094 MANAGER:		
Mrs. Joyce Walton	BT1207	7094
JOB STATUS QUERIES:		
SYSTEM/370		7373
7094		7094
Auxiliary Services		2988
INTERACTIVE TERMINAL SYSTEMS:		
System Status		6234
APL		7200
ATS		7100
CPS		6200

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 16 disk drives
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 5 printers
- 4 card readers
- 2 card punches
- 6 remote terminals
- 1 paper tape reader

- OS/MVT with HASP

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems services
- 1536K bytes of core
- 8 disk drives
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 70 2741 typewriter terminals

- OS/MVT with CPS, ATS, and APL

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF Room 107
- SYSTEM/360 Model 20 for unit record services
- CALCOMP Plotter
- card sorter

UNIVERSITY OF TORONTO
COMPUTER CENTRE
TORONTO, CANADA